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19 June 2006

Date

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Patent Application (laid open) **23 29 929**

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Title: Prosthesis

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Request for examination pursuant to § 28 b PatG submitted

Prosthesis

The invention relates to a prosthesis for the stump of an amputated human limb, in particular a leg prosthesis.

It is known that electrical charges are generated in the individual muscle groups of an amputation stump. Experience has furthermore taught that certain lacquers on the inner wall of a synthetic leg shaft as well as synthetic leg shafts themselves, which are produced of synthetic material, for example casting resin, act in principle like a type of Faraday cage and lead to the accumulation of generated charges at the stump end and subsequently lead via the nerve paths to phantom pain and stump complaints.

The invention is based on the task of providing an arrangement in a prosthesis of the above described type, with which the electrical charges generated in or on the stump can be conductively discharged. For this purpose the invention provides that the prosthesis comprises electrically conducting means, which, on the one hand, are intended for making contact with the stump and, on the other hand, are at least intermittently connected to a contact, in particular on the plantar surface or the palmar surface of the prosthesis. The electrically conducting means can preferably be comprised of one or several wires. However, in further development of the invention it is possible to obtain an electrically conducting connection in such manner that the synthetic material employed for the production of the shaft of the prosthesis comprises an admixture of a powdery, electrically conductive substance, in particular of graphite. If the prosthesis has in its shaft an inner coating, in particular of a lacquer, as is relatively frequently the case, by utilizing the teaching according to the invention the inner coating may comprise an admixture of a powdery, electrically conductive substance, in particular of graphite. In the shaft, especially in leg prostheses, a stump insert acting like a cushion is frequently disposed. In this case it can be provided according to the invention that the stump insert is at least partially comprised of a flexible cellular material which contains an admixture of a powdery electrically conductive substance, in particular of graphite.

The above proposed measures may be provided singly as well as also in combination in a prosthesis according to the invention.

As an embodiment example of the invention the drawing depicts a leg prosthesis for a thigh amputee in partial section and in simplified illustration.

The prosthesis comprises a thigh shaft 1 serving for the reception of a (not shown) amputation stump and a lower leg piece 3, connected with it via an articulation 2, with a foot reproduction 4. The inner wall 5 of the hollow shaft space 6 is lined with a stump insert 7 of a cellular material acting as a cushion. This cellular material comprises a high admixture of powdery graphite, due to which the cellular material acquires electric conductivity. The cellular material of the stump insert 7 is therefore capable of conductively discharging from the stump electrical charges generated on the amputation stump due to muscle contractions, through friction or in any other way, such that the otherwise frequently observed tendency to phantom pain and other complaints is prevented.

Beneath the stump insert 7 at the lowest site of the inner space 6 a large-area contact electrode 8 of brass plate is disposed to which a cable 10 is soldered which is formed into the synthetic material of which the shaft 1 is produced. This cable is carried through the hinge [sic] 2, passes through the lower leg piece 3 and, on the side of the sole in the zone of the heel, ends in a contact plate 12 at which an electric connection to a (not shown) countercontact can be established. This countercontact is disposed in the heel of a shoe, also not shown, and which during the walking movements conducts the charges absorbed from the stump insert 7 to ground.

For the conductive discharge of the electric charge it is entirely sufficient if the amputation stump, which through the unavoidable pumping movement during walking comes only for brief times into contact with the stump insert, is only briefly loaded during the individual steps and kicks.

In the described embodiment example the cable 10 ensures the direct conductive discharge of the charges to the heel contact 12 coming into contact with the ground. For many application cases it is however already sufficient, if, instead of a heel contact 12, in the manner known from antenna technology, the diversion to an electric counterweight takes place, which is formed of a sufficiently large electrically conductive mass and which can be located for example in the knee joint [sic] 2 or which may be disposed in the form of a stump ring in the shaft.

Claims

1. Prosthesis for the stump of an amputated human limb, in particular a leg prosthesis, characterized in that the prosthesis comprises electrically conducting means, which, on the one hand, are intended for making contact with the stump and, on the other hand, are at least intermittently connected to an electric counterweight, in particular to a contact on the plantar surface or palmar surface of the prosthesis.
2. Prosthesis as claimed in claim 1, characterized in that the electrically conducting means are at least partially comprised of an electrically conducting cable or wire piece.
3. Prosthesis as claimed in claim 1, characterized in that the synthetic material employed for the production of the shaft (1, 3) of the prosthesis comprises an admixture of powdery, electrically conductive substance, in particular of graphite.
4. Prosthesis as claimed in claim 1 to 3, whose shaft comprises an inner coating, in particular of a lacquer, characterized in that the inner coating comprises an admixture of powdery electrically conductive substance, in particular of graphite.
5. Prosthesis as claimed in one of claims 1 to 4, with a stump insert disposed in the shaft and acting as a cushion, which is preferably comprised of a flexible cellular material, characterized in that the stump insert (7) comprises an admixture of a powdery electrically conductive substance, in particular of graphite.